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# PROBLEMS IN FINANCING SEWAGE TREATMENT FACILITIES

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# Problems in Financing Sewage Treatment Facilities

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21

# Problems in Financing

# Sewage Treatment Facilities

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control
Washington 25, D.C.

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## FOREWORD

In the past 10 years, municipalities in the United States have built some $3.2 billion worth of sewer interceptors and sewage treatment plants. Yet this has not been enough to curb water pollution nor to protect our country's water supplies. We have done much, but not enough. In the years ahead, we must do more.

Local communities face many problems in building waste treatment facilities. One of the greatest of these is financing—obtaining the necessary sums of money at fair and equitable rates, with the requisite consent of property owners and citizens.

This report, prepared by a committee within the Public Health Service, summarizes the difficulties which local communities encounter in this field. It points out some of the financing problems which municipalities are helpless to control, problems such as inflation and the general level of interest rates. It identifies other problems which are susceptible to local solution, such as management of bond issues and the adoption of good administrative practices. And finally, it reviews suggestions which have been made to improve the position of municipalities, particularly the smaller cities and towns which at present face the greatest difficulties in borrowing money.

In the course of preparing this report, a number of persons were interviewed and a very considerable literature was reviewed. The Public Health Service is grateful for the help it has received from outside sources and hopes this resulting study will be of use to these persons and to all the communities in all 50 States.

The need for a more aggressive, more effective attack against the problem of water pollution is recognized by thoughtful students of our economy. The 87th Congress has greatly strengthened the Federal Government's program by enacting Public Law 87–88, which increases the Government's aid to local communities and broadens its enforcement powers. This bill, signed by President Kennedy on July 20, 1961, represents only one part in our national fight for clean waters. States, inter-State agencies and municipalities everywhere have their own responsibilities and their own part to play.

This problem can be met during the 1960's within the classic American tradition of Federal-State-local cooperation. However, only a major effort will suffice.

The Public Health Service is grateful for the help of many persons in the municipal finance field who contributed to the preparation of this

document. Directing research for the project within the Division of Water Supply and Pollution Control was Donald A. E. Beer of the Basic Data Branch, working with a committee headed by James J. Flannery, Chief Economist, Technical Services Branch, and including Richard S. Green, Chief, Basic Data Branch; David H. Howells, Chief, Construction Grants Branch, and Murray Stein, Chief, Enforcement Branch.

GORDON E. MCCALLUM,
*Chief, Division of Water Supply*
*and Pollution Control.*

## INTRODUCTION

At the end of 1960, the Conference of State Sanitary Engineers, composed of the Chief Engineers of the State Health Departments, concluded a survey that indicated the United States needs approximately 5,200 new sewage treatment plants, plant enlargements, and additions, costing $2 billion. The great majority of them—91 percent—are needed to serve communities of less than 10,000 population. The burden of financing sewage treatment facilities is thus widely spread throughout a large number of local government units.

The Public Health Service estimates from this survey that these needs, together with new ones resulting from plant obsolescence and population growth will carry an annual price tag of $600 million.

This report deals with the problem of financing these facilities, a problem which is central to this country's overall program of water pollution control. It deals with the available methods of financing, the difficulties associated with each method, and the extent to which the methods and the difficulties are a product of the economic system or a product of the ecology of local government. Suggestions for ameliorative action are also identified and examined.

## PROVISIONS FOR FINANCING

### *Legal Setting*

State laws provide the framework which controls local government finance. Oftentimes, both statutory and constitutional provisions specifically apply to bond sales. Historically, these legal provisions were intended to assure local fiscal responsibility and owe much of their stringency to economic depression.

Many officials regard these provisions as unduly restrictive. This has been especially true in recent years when the burden of public works construction has been heavy due to postponement during depression and war. Some alleviation of the condition has occurred during recent years in several jurisdictions. The changes have been relatively few, however, so that the statutes continue to retard ready access to the market and constitute an adverse effect on cost.

No matter what the degree of restriction, the controls take one or several of the following forms:

1. Debt limitations which restrict the outstanding debt to a percentage of real estate assessed valuations;

2. Tax limitations which restrict the rate which can be levied to provide debt service payments;

3. Interest rate limitations which restrict the percentage that can be paid for borrowed money.

Bond referenda that are limited to property owners or require more than a majority vote for approval also constitute restrictions on the borrowing process.

## *Financing Methods*

Financing methods may be grouped into three general categories: leasing, pay-as-you-go; and borrowing.

*Leasing.*—This method is often suggested by study groups, but is not a realistic alternative as it is rarely available. The method calls for a higher level of government, or a private agency building a plant and then leasing it to the community. The community meets only the periodic payments or rents which may be obtained from sewer rentals or taxes. In this manner, the capital financing is provided by the agency constructing the facility so that the community avoids the capital problem. Unless a subsidy is provided, the lease payments or rents reflect all costs including the interest costs.

*Pay-as-you-go.*—This method involves the accumulation of capital funds prior to construction. It is unusual to earmark a sum large enough to pay for an entire plant, so the method is ordinarily confined to enlargements or alterations. Likely sources of pay-as-you-go funds are the revenues from the sewerage or water works, other local government utilities, or special taxes or charges.

Legal restrictions pertaining to the accumulation of large balances and prohibitions of special taxes or charges may render this method impossible for many communities.

*Borrowing.*—This method may be accomplished through a local bank or other financial institution or by the public sale of bonds.

Borrowing directly from a local bank or other institution is restricted by the reluctance of most local banks to lend funds for a local government project. Their reasons are several: (1) In the absence of competitive bidding, banks are subject to criticism for receiving what may be regarded as too high an interest rate. (2) Lending money for one local government project invites requests for other loans which may be difficult to refuse. Thus, a bank might become too heavily involved with loans of this type, compromising investment diversification and the flexibilty which prudent banking practice requires. (3) A local bank may have difficulty in obtaining increased taxes or charges if the project in future years fails to meet financial expectations and the security of the loan is imperiled.

Since leasing and "pay-as-you-go" are unavailable for most communities, and since borrowing from local financial institutions is often undesirable or difficult, over 90 percent of communities resort to bond sales. This report

consequently, will look closely at that method and the difficulties involved.

Before examining the matter of bond sales, however, financial assistance from higher levels of government should be mentioned. Such assistance includes low interest loans and outright grants, provided by either the Federal or State governments. The Federal construction grants program (P. L. 660, sec. 6, 1956, as amended by P. L. 87–88), administered in cooperation with the States, is the best known of these programs. This program now provides that a community may receive up to $600,000 or 30 percent of eligible project costs whichever is less, and allows several communities to join in a project with each eligible for assistance. The total grant for a single project serving several communities may not exceed $2,400,000.

The Federal Housing and Home Finance Agency provides advance planning and construction loans as a further form of assistance and in addition to these Federal programs, several States provide financial support. No matter whether Federal or State support is available, however, the community must still raise a considerable portion of the capital costs.

## NATURE OF THE MUNICIPAL BOND

A municipal bond is the legal, written expression of the terms on which the municipal borrower agrees to repay the lender the face value of the bond plus interest. The outstanding feature of all municipal bonds, distinguishing them from corporate, Federal Government, and foreign bonds, is the exemption of their interest payments from Federal income taxation. As a result, their interest rates are lower. Table I illustrates why these bonds are attractive to investors in the high tax brackets. A 5 percent interest rate has been used for the taxable bonds; the several income brackets are based on the 1960 Federal personal income tax provisions for single persons.

TABLE I.—*Equivalent interest rates on taxable and nontaxable bonds*

| Taxable income of a single person | Taxable bonds interest rate | Equivalent interest rates of nontaxable bonds |
|---|---|---|
| | *Percent* | *Percent* |
| $10, 000 | 5 | 3. 1 |
| 20, 000 | 5 | 2. 2 |
| 26, 000 | 5 | 1. 9 |
| 44, 000 | 5 | 1. 4 |
| 90, 000 | 5 | . 65 |

There are three major categories of municipal bonds: general obligation, revenue, and special assessment.

*General obligation bonds* represent a pledge of the full faith and credit of the community. The community indicates by this instrument that all of its financial resources are available for repayment of the debt. In gen-

eral, the investor regards this type of bond with the most respect, for it offers the greatest assurance his loan will be repaid.

*Revenue bonds* pledge only the income from the particular utility as repayment for the debt. This pledge is less inclusive than the full faith and credit, and the investor regards it as somewhat less reliable. Consequently, revenue bonds usually carry higher interest rates, acknowledging the greater risk involved. The earning record and managerial quality of the utility establish the strength of the bond. A newly organized sewage district, consequently, is treated as a greater risk because it has not established an earning record.

*Special assessment bonds* are much more limited in their use. These bonds are supported by taxation, usually on a front-foot basis, on the particular pieces of property whose value is enhanced by the public works project. Because of the severely limited repayment pledge, and the poor record of this bond during the depression of the 1930's, investor acceptance is low. In most jurisdictions, it is no longer used.

## *The Revenue Bond in the Water and Sewerage Works Field*

Although the majority of public borrowings for water and sewerage functions are by general obligation bonds, revenue bonds are significant for two reasons: (1) Revenue bonds are often used to circumvent the debt limits, for self-liquidating borrowings usually are exempt from this restriction; and (2) When the earnings of waterworks or sewerage utilities are pledged for bond repayment, the bonds acquire a special aura of reliability. This aura first developed around waterworks revenue bonds, particularly during times of economic stress when other municipal bonds encountered repayment difficulties, either of interest or principal. The water bond maintained a virtually unsullied record of payment constancy because of the necessity of water service, the threat of cutoff of water service assuring that consumers would pay the water bill and thus sustain the revenues. Investors were quick to note this financial integrity, and municipal officials slowly brought sewer bonds to share this advantage.

The sharing was achieved in two ways. First, water and sewer operations were combined under one administrative organization so that revenues from both water bills and sewer rental charges could be pooled in support of a bond issue. Second, resort to water service cutoff was made for nonpayment of the sewer charges. In addition, the water and sewer charges were submitted on one bill which insured the likelihood of mutual payment. By these means, sewer bonds acquired virtually the same high standing in the investor's view as water bonds. There is no evidence that sewer bonds appear at any disadvantage in the market compared to other bonds. The sewer bond position has been enhanced by association with water bonds and operations.

## THE PROCESS OF SALE

### *The Setting*

*The "money market."*—This term is applied to the various financial districts, their operations, and the entire borrowing-lending process associated with money, including both private and public transactions. Because these transactions are relatively numerous and well-publicized, one can refer to "money costs" or the "interest rate" being high or low at any time. In this sense the rate quoted or cited is some general average or the recent borrowing rate of several important issues.

The individual local government has virtually no control over the general level of interest rates. Chart I indicates the variation in the general interest rate of certain high grade municipal bonds from 1910 to 1960. Despite the current protest against high interest rates, the chart reveals that interest rates were higher until the 1930's. Except for brief periods, the trend has been upward again since 1950.

*The size of the market.*—As shown in table II, new issues of stocks, bonds, debentures, and notes have amounted to slightly more than $30 billion annually in recent years. Of this amount, less than $8 billion, or less than 25 percent, represented the sale of State and local government securities. Sewer and sewage treatment bonds together averaged less than $500 million or less than 1.5 percent of total new security issues. These figures indicate that even a twofold increase in sewerage bond sales would have little effect on the market.

TABLE II.—*New security issues*

[Million dollars]

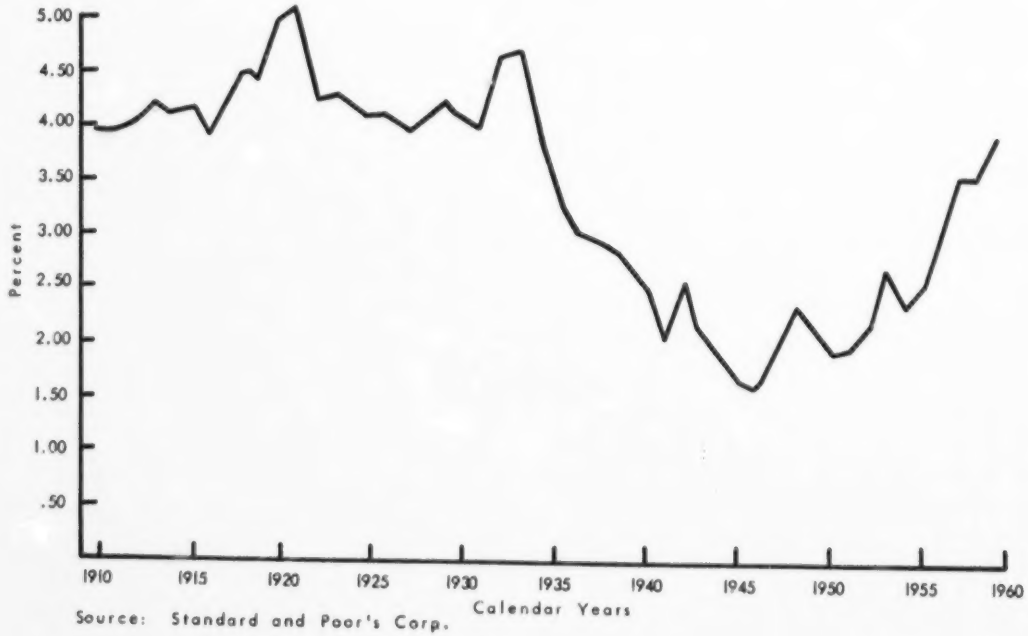
| Year | Total [1] | State and municipal [1] | Percent of total | Sewer and sewage treatment [2] | Percent of total |
|---|---|---|---|---|---|
| 1946 | $18,685 | $1,157 | 6.2 | (3) | ..... |
| 1957 | 30,571 | 6,958 | 22.8 | $407.5 | 1.3 |
| 1958 | 34,443 | 7,449 | 24.7 | 526.3 | 1.5 |
| 1959 | 31,074 | 7,681 | 24.7 | 433.2 | 1.4 |

[1] Security and Exchange Commission Annual Reports, 1946, 1957, 1958, 1959.
[2] Bond data provided by Investment Bankers Association of America.
[3] Not available.

Private individuals account for about a third of the ownership of municipal bonds. Commercial banks, nonbank financial institutions, and State and local government retirement funds make up most of the rest. Life insurance companies are now entering the market reportedly due to changes in the Federal corporate income tax. This group, and the retirement funds, constitute the major extensions of the market in recent years. An as yet undetermined influence on market size is the income tax exemp-

Chart I

AVERAGE INTEREST RATE FOR HIGH GRADE MUNICIPAL BONDS, 1910 - 1960




Source: Standard and Poor's Corp.

tion recently established for dividends of mutual funds whose income is derived from municipal bonds. Population increases and rising personal income levels also contribute to market enlargement in an undetermined volume.

A deterrent to the entry of small investors in the bond market is the relatively large denomination—$1,000—in which bonds are usually issued. A small investor can more readily enter the stock market where the unit investment is often as low as a few dollars. Savings bonds of the Federal Government sold in denominations as low as $25, often on a payroll deduction basis, represent an attempt to reach the small investor.

*The cost of borrowing money.*—The major influence on the cost of borrowing money is the general level of the interest rate and this in turn is determined by the demand for, and supply of funds in the money market. Inflation and the monetary policy of the Federal Reserve banking system influence the demand-supply situation. Inflation pushes interest rates upward, for the investor seeks to protect himself by a higher interest rate against a decline in purchasing power of the dollars he will receive at the maturity date of his bond. It also reduces the supply of funds for the purchase of bonds, as investors may regard the increase in interest rates as insufficient protection against the uncertainties of inflation and leave the bond market for the stock market. A "tight" Federal Reserve money policy also reduces the volume of investment funds available, by various credit controls.

The interest rate on a particular bond issue is a function of the condition of the general market modified by the bond issuer's reputation for reliability for repayment and the specific features of the issue. Specific features and their effects will be discussed later in this report as will relatively minor costs associated with the borrowing process.

*Attempts to influence the interest rate by Government aid programs.*—The interest rate obtained by a municipality may be affected by aids provided by higher levels of government. Financial grants, however, are not generally regarded as producing this effect. Bond saleability is improved, however, because the investor apparently feels that a project that has met the scrutiny of State and Federal officials has some qualities that will be reflected in earnings and repayment potential. The sewage treatment plant construction grants provided under section 6 of the Federal Water Pollution Control Act (P. L. 660) give somewhat more positive assurance of these qualities since the act provides that the Federal Government must be assured that the local government can raise its share of the construction costs, will complete the project, and operate it effectively.

A favorable shift in the interest rate; that is, a reduction in the net interest borrowing cost of a local government, can be achieved by the actions of a higher level of government. Such actions include the pledging of credit in support of the local bond issue, borrowing for the local governments, or purchasing the bonds of the local issuer.

At least one State—New Hampshire—pledges its credit in support of local governments' sewage treatment plant construction bonds up to a total of $10 million. In addition, Oregon provides a revolving fund of $1,655,000 for State purchase of the sewerage bonds of communities of less than 3,500 population that encounter certain difficulties in bond sales. California provides a million dollar loan fund at 2 percent interest for sewerage and storm drainage facilities of local governments.

A different kind of assistance is provided by Michigan and New Jersey. These States permit the community debt limits to be exceeded if the State pollution control agency insists that construction of a sewage treatment plant is required.

The Texas Water Development Board has established a fund from which local governments may borrow for waterworks development. This procedure allows the local governments to obtain approximately the same net interest rate as the Development Board, a rate lower than the local unit could borrow directly in the market. If applied to sewage treatment plants, similar results could be expected.

Two States—North Carolina and Virginia—have established commissions to aid local governments in the preparation and sale of bond issues. North Carolina requires all local borrowings to proceed through the Commission. Virginia's Commission operates on a permissive basis. The wider experience and specialized staff of the Commissions improve the local governments' ability to cope with the market situation.

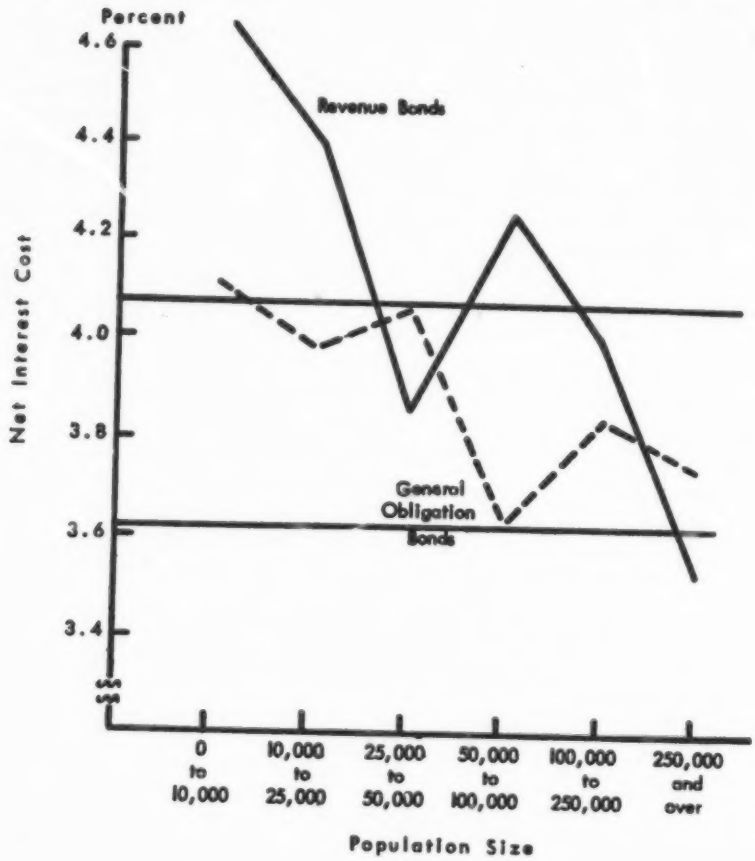
Two agencies of the Federal Government are directly involved in influencing borrowing costs for public works construction. The Housing and Home Finance Agency makes loans for public works construction to communities unable to sell bonds at favorable rates. A ceiling of 3½ percent is set under this program for communities of 50,000 or less and a ceiling of 3⅛ percent for communities of 150,000 or less which also qualify under the Area Redevelopment Act of 1961.

The Public Housing Administration supports bonds of local government housing authorities by pledging the full faith and credit of the United States. As a consequence, the bond rating agencies rank these bonds in the top classifications. Despite this endorsement, however, these bonds command less favorable interest rates than other top-rated bonds. This differential is attributable to delays in collection which might occur in case of default by the local issuer.

The several programs cited improve the financial position of the local governments in various ways. The actual number of purchases of bonds is probably not increased, however. Instead, investors are attracted to the strengthened issues away from less supported bonds. The net interest cost of a local government bond issue is reduced, of course, to the extent that the credit position is improved. Generally, it is the smaller local governments which benefit the most by this kind of assistance, for they usually encounter the highest interest rates. See chart II.

CHART II

NET INTEREST COST OF SEWER BOND SALES, 1959
(by population of the issuing local government)




Based on Data Provided by the Investment Bankers Association of America.

*The investment bankers' role.*—The establishment and operation of the actual process of exchange between the bond issuer and the investor has become the investment banker's business. He buys the bonds in competition with other bankers and resells them to the ultimate investor. Often, a bond issue is so large that several investment banking houses join in the purchase and sale. The entire issue is purchased in this manner and then resold, usually to a variety of investors. The difference between what the

investment banker pays for the issue and his resale price constitutes his profit. The size of this is determined largely by the banker's estimate of the speed of his resale. The bond issuer benefits when there are numerous active purchasers.

Bond issuers will encounter resistance from the investment bankers if the bankers are carrying a large inventory of bonds due to the sluggishness of the market. Resistance will also occur if the issuers seek to obtain an interest rate below the market or prescribe other limitations. The condition of the secondary market may also be important. If the bonds of a particular issuer are being offered in large quantities for secondary resale, investment bankers are unlikely to purchase new issues from the same local government. Incidentally, a community may be able, occasionally, to buy back some of its own bonds on this market and thus reduce its interest payments.

*Bond rating agencies.*—These are several private agencies which evaluate the credit of local governments. Their determinations provide a reference for bond investors, permitting comparison among bond issues. They materially affect the cost of money to a local government.

Communities with less than $600,000 of bonded debt are not rated, nor are revenue bond issues of less than that amount. This size limitation denies a rating for most small communities. Some communities who meet the debt and issue limitations are not rated because the communities fail to submit the necessary information to the rating agencies.

Table III, based on bond ratings for 1960, shows that the highest ratings are concentrated in the larger communities.

TABLE III.—*General obligation sewer bonds 1960 Moody ratings*

[Percentage based on number of issues]

| Municipal population | Top rating | Top 3 ratings | No ratings |
|---|---|---|---|
| | *Percent* | *Percent* | *Percent* |
| Under 10, 000 | 0. 0 | 7. 8 | 87. 6 |
| 10, 000 to 25, 000 | 3. 3 | 50. 0 | 28. 3 |
| 25, 000 to 50, 000 | 7. 1 | 69. 0 | 16. 7 |
| 50, 000 to 100, 000 | 10. 0 | 80. 0 | 3. 3 |
| 100, 000 to 250, 000 | 9. 1 | 86. 4 | 4. 5 |
| 250, 000 to 500, 000 | 42. 9 | 76. 2 | 23. 8 |
| 500, 000 to 1, 000, 000 | 23. 1 | 84. 6 | 0 |
| 1, 000, 000 and over | 18. 2 | 100. 7 | 0 |

Based on data provided by Investment Banker's Association of America.

## *Managing the Issue*

A local government can enhance the attractiveness of its bond issues by managing them well and by maintaining a high quality of municipal administration.

Good management of the bond issue begins with the design of the bond. This refers to such features as the choice of the dollar volume, the method of repayment, and the distribution of maturities or payment schedule.

*The dollar volume.*—This must be carefully determined so that sufficient funds are obtained to avoid the need for another immediate borrowing. Often overlooked is the necessity of obtaining funds to cover interest payments during construction, particularly when the revenues pledged for repayment are to be obtained from the sewage plant operations. Other expenses which should not be forgotten are engineering costs, repayment of all prior loans and advances, real estate acquisition costs, legal fees, trustees' fees, and printing costs. If these are overlooked, early payments must be made from taxes or from another borrowing. In the latter event, new legal and other administrative costs will be incurred. The investment banker, the finance officer, and the consulting engineer can help the local government avoid these errors.

*Method of repayment.*—The method chosen for paying off the bond issue is of major importance. If revenues from the plant are to cover the costs, it will be imperative to have a thorough study made to determine the proper rate schedule and the timing of the income. The consulting engineering firm and financial advisor can perform this task.

*Distribution of maturities.*—The two standard methods for repayment are annuity retirement and serial retirement. Annuity retirement requires a constant dollar payment annually, involving a varying division between principal and interest each year. Serial issues provide that portions of an issue mature after various periods of time. Most present day issues are serial issues.

Serial issues may be designed to the mutual advantage of issuer and investor. Investors benefit by being able to invest for any of several periods of time, and the issuer benefits by scheduling the repayment in accord with expected income or tax receipts. Temporarily idle investment funds may be attracted to short-term maturities, enabling the issuer to obtain a favorable rate on this portion of the issue.

The maturity period of an issue or of an individual bond has a direct effect on the total interest charges. For a net interest cost of 4 percent, retirement of $1,000 over 10 years requires total payments amounting to $1,232.90. If the bonds are retired over 20 years, the necessary payments will amount to $1,471.60. The reason for the increased cost, of course, is that the interest payments continue for a longer period.

The most costly method of financing is one which jeopardizes the credit of a municipality by attempting an impracticable repayment schedule. One default becomes a long-time handicap adversely affecting both the interest rate and bond saleability. Therefore, the desire to save interest charges by shortening the maturity period must be tempered by a realistic estimate of repayment ability.

The two methods of bond repayment are illustrated by table IV. The table assumes that $100,000 of bonds must be retired and that a 4 percent interest rate must be paid.

TABLE IV.—*Retirement payments per year*

[Thousand dollars]

| Year | Serial retirement | | Total | Annuity retirement | | Total |
|---|---|---|---|---|---|---|
| | Principal | Interest at 4 percent | | Principal | Interest at 4 percent | |
| 1 | $5 | $4.0 | $9.0 | $3.36 | $4.0 | $7.36 |
| 2 | 5 | 3.8 | 8.8 | 3.49 | 3.87 | 7.36 |
| 20 | 5 | .2 | 5.2 | 7.08 | .28 | 7.36 |
| | 100 | 42.0 | 142.0 | 100 | 47.16 | 147.16 |

*The bond sale.*—The management of the sale requires considerable finesse, particularly the case of timing. This refers to the period of the year when the issue is to be submitted for bids. Only a person thoroughly familiar with the peculiarities of the bond market and skilled in the market process can advise when the proper timing may be achieved. Seldom do small local governments possess such talents. In these cases, investment bankers and financial consultants can provide valuable guidance.

The bond attorney belongs in the bond sale picture, for the legality of the issue must be definitely established to assure receptivity at time of offer. In addition to this assurance, saleability is bolstered if the bond issue is approved by a referendum. Oftentimes a public relations campaign is necessary to assure favorable action by the electorate on the bond referendum.

The State sanitary engineer, the State university, the State municipal league, or the Municipal Finance Officers' Association of Chicago can suggest the names of such consultants.

*The community's reputation in good administration.*—The local government's reputation is improved by evidence of sound management practice. Thorough municipal accounting systems are a mark of good administration. Periodic statements of operating figures persuade investors that operations are under continuous scrutiny and that any malpractice will be revealed and corrected. Good accounting practice also helps bond rating agencies and provides the basis for systematic budgeting.

Budgeting includes both the capital budget and daily operational control. Capital budgeting is the financial expression of the long-range physical planning program as well as a reflection of estimates of long-run program trends. Investors and investment analysts are favorably impressed by these indications of systematic procedure.

Orderly and impartial property assessment, tax administration, and payroll controls are other indicators of a disciplined organization. The effect of these management qualities on the interest rate is not measurable. Financial analysts, however, claim that such administrative practices improve the saleability of bond issues.

In this respect one action a local government may be able to take as the result of systematic examination of its own situation is a reappraisal of its property assessment status. The removal of inequities, and the adjustment of the valuations to acknowledge increases in the general level of prices in the real estate market permit the enlargement of the debt limit, which is based on total assessed valuation.

Management studies are also valuable. They may lead to departmental reorganizations such as unified water and sewerage departments, or in some cases, they may result in cooperation with adjacent communities in an area approach to a sewage treatment problem. This can reduce per capita costs, pool financial resources to escape debt limits, and reduce interest rates. The potential value of unified action can be seen in chart III (see p. 14) which shows a favorable correlation between size and per capita costs.

Communities may also unite to support attempts at legislative changes or to study general problem situations.

## CONCLUSION

The difficulties which are encountered by local governments financing sewage treatment facilities are numerous and vary from case to case. Some are attributable to legal complications; some, to the nature of the money market; some, to the nature of municipal bonds; and some, to inexperience with financing procedures on the part of local officials.

The difficulties involving legal considerations require the attention of legal experts and, in most instances, are beyond the power of local officials to correct. In any event, cooperation between local and State officials is necessary to achieve improvement in the legal situation.

Local governments have no control over the general interest rates established by forces in the money market, nor can they control inflation.

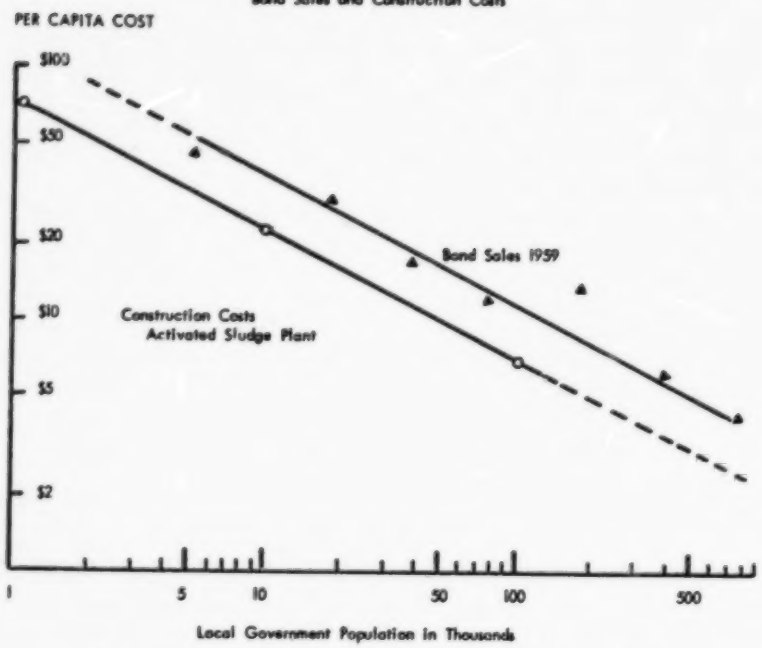
An important influence on the cost of financing sewage treatment facilities is the size of the communities. Large cities, over 100,000 in population, generally have more experience in financing and greater resources. Investors are more familiar with economic conditions in these cities and can be guided by financial ratings often not available for smaller communities. Construction costs for larger installations are less per capita than for smaller plants. Management of bonds issues in the smaller communities is often less expert, because of the lack of experience of financial officers. The employment of consultants can offset this handicap considerably, as can assistance from State agencies.

Sewerage bonds reveal no particular adverse reception in the market compared to other government bonds. Indeed, since sewerage bonds are

Chart III

SEWAGE TREATMENT PLANT FINANCING

Per Capita Data
Bond Sales and Construction Costs




Source: Based on Bond Data Provided by the Investment Bankers Association of America and on Data developed by P. P. Rowan, K. H. Jenkins, and D. W. Butler, "Sewage Treatment Construction Costs," Journal Water Pollution Control Federation, June, 1960, pp. 594-604.

being more frequently linked with water bonds and since the two functions are often administered jointly, the sewerage bond is acquiring much of the solid reputation of the water bond.

In conclusion, the general difficulty of financing treatment facilities may be attributable to the complexity of the borrowing process, both from the standpoint of the legal requirements and the economic order. This affects all local governments, but the smaller ones are less able to adjust than the larger. Therefore, consideration should be given to a thorough overhaul of the legal controls, acknowledging changed economic conditions and permitting wider discretion at the local level. Assistance from State governments in the form of advice and consultation as to the intricacies of the borrowing process also is imperative. Short courses and workshops in financial management, for local government officials, at the State universities would facilitate this end. The significance of local financing for the

stability of the governmental process requires close attention to improvement of the current situation.

## BIBLIOGRAPHY


Chamberlain, L., and Edwards, G. W. The Principles of Bond Investment. New York: H. Holt and Co., 1927.

Chatters, C. H., and Hillhouse, A. M. Local Government Debt Administration. New York: Prentice Hall Co., 1939.

Chermak, L. E., *The Law of Revenue Bonds,* Washington: National Institute of Municipal Law Officers, 1954. (Institute Report No. 142.)

Curvin, W. S. A Manual of Municipal Bonds. New York: Smith, Barney and Co., 1956.

Kuznets, Simon, *Capital in the American Economy, Its Formation and Financing.* A Study by the National Bureau of Economic Research. Princeton University Press, 1961.

Nadler, Marcus; Heller, Sipa; and Shipman, Samuel S., *The Money Market and Its Institutions.* New York: The Ronald Press, 1955.

Robinson, R. Postwar Market for State and Local Government Securities. Princeton: National Bureau of Economic Research, 1960.


## REPORTS, PERIODICALS


Committee on a Program of Model Fiscal Legislation for Local Governments, *A Model County and Municipal Bond Law.* New York: The National Municipal League, 1953.

De Leuw, C. E. "The Role of the Consulting Engineer in Revenue Bond Financing," Municipal Finance (Chicago) (February 1954).

Ellinwood, D. M. "Factors in Municipal Bond Ratings," Public Management (Chicago).

Investment Bankers Association of America. Fundamentals of Municipal Bonds. New York: The Association, 1956.

McGee, C. "Factors Influencing Interest Rates in the Capital Market," The Daily Bond Buyer, Conference Issue No. 2 (New York) (June 20, 1960).

Ramsey, J. B. "The Need, Function, Value, and Cost of a Municipal Financial Consultant," Municipal Finance (Chicago) (February 1954).

Reilly, J. F. "The Finance Officer," The Daily Bond Buyer, Conference Issue No. 2 (New York) (June 20, 1960).

Smith, W. S. "The Scheduling of Municipal Debt Issues," The Daily Bond Buyer, Conference Issue No. 2 (New York) (June 20, 1960).

Sperling, T. "Public Relations Aspects of Promoting a Bond Issue," Journal (of the) Water Pollution Control Federation (Washington, D.C.) (June 1961).

Zock, S. I. "Engineering Aspects of Financing Sewerage Authority Proj-

ects," Journal (of the) Water Pollution Control Federation (Washington, D.C.) (August 1960).

"Debt Management and Municipal Credit," *Municipal Finance,* February 1957, Chicago: The Municipal Finance Officers Association, 1957.

"Financing Water and Sewage Works," Portland Cement Association (Washington, D.C.) (1957).

"Fundamental Considerations in Rates and Rate Structure for Water and Sewage Works," American Society of Civil Engineers and Section of Municipal Law of the American Bar Association. Ohio State Law Journal (Columbus, Ohio) (Spring 1951).

"Intermunicipal Arrangements for Sewerage Service," Management Information Service No. 104, International City Managers Association (Chicago) (September 1952).

"Marketing Municipal Bonds," The Municipal Finance Officers Association, Special Bulletin (Chicago) (1946).

"Municipal Financing of Sewerage Facilities," Economic Division of the Legislative Reference Service, Library of Congress (Washington ,D.C.) (June 24, 1953).



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